

TITLE OF INVENTION

**MULTI-PURPOSE HYBRID TERMINAL AND METHOD FOR
PREPARING FAST IMPLEMENTATION OF FUNCTIONS**

CLAIM OF PRIORITY

This application makes reference to, incorporates the same herein, and claims all benefits accruing under 35 U.S.C. §119 from an application for *MULTI-PURPOSE HYBRID TERMINAL AND METHOD FOR PREPARING FAST IMPLEMENTATION OF FUNCTIONS* earlier filed in the Korean Intellectual Property Office on 4 August 2003 and there duly assigned Serial No. 2003-53797.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a multi-purpose hybrid terminal, and more particularly, to a multi-purpose hybrid terminal and a method for preparing fast implementation of functions.

Description of the Related Art

Generally, a mobile terminal can be preset to implement a particular function under conditions desired by the user. When a condition is met, the mobile terminal implements the preset function. For example, if the user sets an alarm time (that is, a condition), the mobile terminal will

1 sound an audible alarm (that is, the function) at the fixed time. In other words, the user presets a
2 minute and an hour as a condition precedent, and when that condition is met, the function is
3 performed by the mobile terminal.

4 In a mobile terminal primarily for voice communication, an additional function, such as
5 alarm, is implemented only upon input of the user's demand. Therefore, the mobile terminal does
6 not offer enough convenience to the user who wishes to implement such an additional function.

7 Japanese Unexamined Patent Publication No. 2002-108685, entitled *Game Contents*
8 *Acquisition System for Mobile Telephone Set*, mentions a technique for a game contents acquisition
9 system in a mobile telephone overcoming problems associated with the slow transfer of image data
10 files, which are substantially greater in size than are text files, to a mobile device such as a mobile
11 telephone through a telecommunication line.

12 The Japanese reference, however, does not explain how to read out the game data stored in
13 the mobile telephone.

14 The Nokia N-Gage™ is a hybrid mobile terminal for Global System for Mobile/General
15 Packet Radio Service with a gaming device's function integrated. When the game function is
16 selected, the game phone is changed to a game mode from a phone mode, but only after the user has
17 repeatedly manipulated the keypad of the mobile terminal many times, while faithfully watching the
18 display of the terminal.

19 I have discovered that the contemporary processes for the initiation and implementation of
20 ancillary and peripheral functions are neither especially suitable, nor particularly convenient for ease
21 of use, in hybrid mobile terminals where the primary function of the terminal is mobility. Moreover,

1 the Mobile Game Interoperability Forum, the MGIF, <http://www.openmobilealliance.org/mgif/>)
2 emphasizes that game phone users tend to demand fast accessibility to any functions or services
3 because of the mobile environment and the limited power supply. Furthermore, most users carry
4 their mobile terminals all the time and quite regularly use particular functions. Therefore, I have
5 found it necessary to develop hybrid mobile terminals that promptly meet the users' demand for such
6 functions. In other words, I have discovered a need for a method to enable a user to obtain prompt
7 access to a desired function.

8 SUMMARY OF THE INVENTION

9 Accordingly, the present invention has been made to solve the above-mentioned problems
10 occurring in the art. It is therefore, an object of the present invention to provide a multi-purpose
11 hybrid terminal and a process for preparing during one mode, a function to be performed in another
12 mode and informing a user of the completion of the preparation, thereby enabling the user to
13 conveniently use the function, without much time delay.

14 It is another object to provide a multi-purpose hybrid terminal and process enabling a user
15 to prepare, during the pendency of one operational mode, a function to be performed during a
16 different operational mode.

17 It is still another object to provide a multi-purpose hybrid terminal and process that, during
18 the pendency of one mode, informs the user of the operational availability of a function to be
19 performed during a different operational mode.

20 It is yet another object to provide a multi-purpose hybrid terminal and process that enables

1 a user to select a function to be performed during one operational mode, while a different operational
2 mode is in current operational use.

3 It is still yet another object to provide a multi-purpose hybrid terminal and process that
4 informs a user during the pendency of one operational mode that the loading of a function selected
5 by the user has been completed and that the function is available to be performed during a different
6 operational mode.

7 It is also an object to provide a multi-purpose hybrid terminal and process that without
8 interruption of a current operational mode, responds to a user's instruction by completing the
9 operational availability of a function usable during a different operational mode.

10 It is a further object to provide a multi-purpose hybrid terminal and process that without
11 interruption of a current operational mode, responds to a user's instruction by initiating the
12 preparation of a function selected by the user and usable during a different operational mode, and
13 signaling the completion of the preparation by indicating the operational availability of a function.

14 In order to accomplish the above object, there is provided a multi-purpose hybrid terminal
15 having more than one operational mode. A user's demand for access to various functions can be
16 applied to the terminal in advance. The terminal continuously monitors whether a condition
17 satisfying the user's demand has been met. In such a condition, the terminal automatically writes
18 a corresponding program in a memory. After additional selections by the user, the terminal informs
19 the user of its completion of the preparation and of the immediate availability to the user of the
20 selected function.

21 Also, in order for the user to conveniently use additional functions of the multi-purpose

1 hybrid terminal, a condition for implementing a desired function, such as time or place, may be
2 entered in the terminal by the user, such as with a key input by the user. The terminal determines
3 whether the condition has been met by using a timer or, alternatively, a location tracking system.
4 When the condition is determined to have been met, the terminal automatically implements the
5 desired function, even without the user's additional demand. Alternatively, the terminal may inform
6 the user about the establishment of a standby mode for implementing the function and then delay any
7 change in its operational mode to implement the function in accordance with the user's selection.

8 **BRIEF DESCRIPTION OF THE DRAWINGS**

9 A more complete appreciation of the invention, and many of the attendant advantages thereof,
10 will be readily apparent as the same becomes better understood by reference to the following detailed
11 description when considered in conjunction with the accompanying drawings in which like reference
12 symbols indicate the same or similar components, wherein:

13 FIG. 1 is a diagrammatic illustration of a game contents acquisition system for a mobile
14 telephone.

15 FIG. 2 is an oblique perspective illustration of a Nokia N-Gage™ game phone.

16 FIG. 3 shows a sequence of messages that are serially displayed on a hybrid mobile terminal
17 until a selected game is started after a change in mode from phone to gaming device.

18 FIG. 4 is a flow chart showing the several processes that are performed before an additional
19 function is implemented on a conventional hybrid mobile terminal by a change in operational mode
20 from phone to gaming device.

FIG. 5 is a schematic block diagram of a hybrid mobile terminal having a game function according to a first embodiment of the present invention.

FIG. 6 is a schematic block diagram of a hybrid mobile terminal having a game function according to a second embodiment of the present invention.

FIG. 7 is a flow chart showing a process for preparing fast implementation of a function in a multi-purpose hybrid terminal according to the principles of the present invention.

FIG. 8 shows a sequence of messages that may be serially displayed on a hybrid mobile terminal according to the principles of the present invention to inform the user about the completion of the preparation for an additional function.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Hereinafter, preferred embodiments of the present invention will be described with reference to the accompanying drawings. In the drawings, the same element, although possibly depicted in different drawings, may be designated by the same reference numeral or character. Although certain functions, such as a name of a game, are specifically defined in the following description of the present invention, it will become apparent to those skilled in the art that such definitions of functions are presented merely to improve the reader's understanding of the present invention, and that the present invention can be carried out without such specific elements. Also, in the following description of the present invention, a detailed description of known functions and configurations incorporated herein will be omitted when it may tend to obscure the subject matter of the present invention.

1 FIG. 1 is a schematic view of a game contents acquisition system for a mobile telephone as
2 disclosed in Japanese Unexamined Patent Publication No. 2002-108685.

3 In the system of FIG. 1, mobile telephone 1 downloads game contents as files from server
4 1 and stores the files in a cache memory. Mobile telephone 1 outputs the files to its display section
5 in the order they were stored, thereby featuring animation. If such files have been stored in the cache
6 memory in advance however, instead of being downloaded from the server later as needed, the user
7 will not have to wait as long for the output of the stored files to the display section.

8 One technique contemporary to the art is to receive game data from a mobile game service
9 provider, such as server 2, and to store the data in the cache memory in advance for fast access to
10 the game. In other words, the game data is received in advance by a fixed method of the system and
11 wirelessly downloaded, without any input of the user's demand. The Japanese '685 reference,
12 however, fails to teach how to read out or load the game data stored in the mobile telephone.

13 FIG. 2 is an oblique perspective view of a Nokia N-Gage™ game deck phone.

14 This game deck phone is a hybrid mobile terminal that uses the GSM/GPRS (that is, Global
15 System for Mobile/General Packet Radio Service) with a gaming device function integrated into the
16 terminal. When the game function is selected, the game phone is switched from a game mode to a
17 phone mode. Also, game contents stored in a multimedia memory card within the terminal are read
18 out to a main flash memory of the terminal. A script-based game program embedded in a general
19 mobile terminal is stored as a small file in an internal memory of the terminal. Such a small file
20 game program can be implemented after fast memory loading. Memory loading and game mode
21 setting however, take too long to implement a data-rich game program which has a large file size.

1 If a user wishes to use an additional function (e.g., a game) on a hybrid mobile terminal such
2 as a game phone, the user must first press the keys of the keypad numerous times, while
3 simultaneously continuously watching the display of the terminal.

4 FIG. 3 shows an array of exemplary display screens bearing messages that could sequentially
5 be displayed on mobile terminal 1 until a selected game is started after a change in mode from phone
6 to gaming device.

7 The mobile terminal confirms with screen 101 whether the user wishes to change the current
8 mode from a phone mode to an additional function mode such as a game mode with screen 103. The
9 mobile terminal allows the user to select a game stored in the memory card by pressing additional
10 keys.

11 Screens 105 and 107 show messages that are sequentially displayed while a game is being
12 read out and written into the memory. The memory loading process screen 105 and the completion
13 of memory loading subsequently indicated by the message appearing on screen 107.

14 Subsequently, as is indicated by screen 109, the user can select additional options for the
15 game. For example, the user can select a team or any other option for a baseball game. The selected
16 options are displayed on screen 111. The user can then start the game with selected options shown
17 on screen 113.

18 If a function need be repeatedly implemented whenever a particular condition is met, the user
19 may feel inconvenienced because of the need to repeatedly press the keys in order to completely set-
20 up the game function sought by the user, with the processes shown in FIG. 3, and by the subsequent
21 wait until the memory completely reads out the data for the selected game function.

1 FIG. 4 is a flow chart showing the several processes that must be implemented by a mobile
2 terminal in order to switch from the telephone mode in step 121 to a game mode, and to thereby
3 convert a mobile terminal from a phone to gaming device.

4 When turned on, the mobile terminal is initially set in the phone mode at step 121. At step
5 123, the mobile terminal confirms whether the user has input a demand for a mode change. If the
6 user has input such a demand, the mobile terminal will terminate its phone mode at step 125 and will
7 enter into the additional function mode that has been selected by the user at step 127. At step 129,
8 a corresponding program is loaded. At step 131, the mobile terminal determines whether the user
9 has made a key input. Upon detection of such a key input, the mobile terminal will implement the
10 program at step 133. At step 123, a message as shown in screen 101 of FIG. 3, can be displayed.
11 At step 129, messages as shown in screens 105 and 107 of FIG. 3 can be displayed. Also, in step
12 133, messages as shown in screens 109 and screen 111 of FIG. 3 can be displayed.

13 These foregoing processes are not particularly amenable to execution in a hybrid terminal
14 having an important feature in mobility. The Mobile Game Interoperability Forum, (often referred
15 to as MGIF, <http://www.openmobilealliance.org/mgif/>) emphasizes that game phone users tend to
16 demand especially fast accessibility to any functions or services because of the mobile environment
17 and the limited capacity of the power supply of the mobile terminal. Most users carry their mobile
18 terminal at all times and quite regularly use particular functions. Therefore, I have found that it
19 would be necessary to develop hybrid mobile terminals that promptly meet the users' demand for
20 the initiation as well as the implementation of such functions. In other words, I have discovered a
21 need for a method for enabling a prompt access to a desired function.

1 The present invention is applicable to a hybrid terminal having secondary functions, such as
2 a Personal Digital Assistant often referred to as a "PDA", game and TV, in addition to a primary
3 voice communication function.

4 FIG. 5 is a schematic block diagram of a hybrid terminal having a game function in
5 accordance with a first embodiment of the present invention. The terminal can be a game phone.

6 Referring again to FIG. 5, a game phone 141 may be constructed with both elements for voice
7 communication and those for games.

8 An RF/analog section 155 performs wireless transmission and reception, and processes
9 baseband signals. A digital signal processor ("DSP") 159 encodes and compresses speech. In a
10 keypad 163 bearing a plurality of alphanumeric keys, selection keys and functional keys displayed
11 to easy manipulation by a user, is provided to enable user interface with telephone 141; the keys are
12 mapped according to the operation modes of the terminal. A display section 157 provides a variable
13 visual representation of the operation states of the mobile terminal. The displayed states vary,
14 depending on the modes of the terminal. Under the control of a communication microprocessor
15 MPU 165, display section 157 can be used as an alarm to advise the user about the completion of
16 at least one task for implementing a function. A memory 161 may be constructed with a read only
17 memory (ROM) for storing programs for implementing various functions with related data and a
18 random access memory (RAM) for temporary storage of data.

19 Communication microprocessor MPU 165A includes a monitoring section 165a that
20 monitors a condition representative of the progress of the terminal toward satisfaction of the user's
21 demand for activation of an additional function while the terminal remains continuously in the phone

1 mode, a first execute section 165b for performing at least one task to use the additional function
2 when the condition is determined to have been met, a mode changing section 165c for changing the
3 operational mode of the terminal from phone to the additional function, and a second execute section
4 165d for implementing the additional function such as a game selected by the user.

5 A multimedia card reader 147 is a peripheral device that is able to read a removable
6 multimedia card that stores a game program (for example, an MultiMedia Card (MMC), a (Compact
7 Flash (CF) or a Secure Digital (SD) card) that is not separately shown, in order to read and enable
8 terminal 141 to write into memory 161 and to implement an additional function such as an algorithm
9 for a video game. If the hybrid terminal is a TV phone or radio frequency identifier (*i.e.*, RFID)
10 tagged phone, another peripheral, such as a TV receiver or an RFID tag, should be provided. A basic
11 RFID system is constructed with three components, an antenna or coil, a transceiver (with decoder),
12 and a transponder (RF tag) electronically programmed with unique information. The antenna emits
13 radio signals to activate the tag and read and write data to it. Antennas are the conduits between the
14 tag and the transceiver, which controls the system's data acquisition and communication. The
15 electromagnetic field produced by an antenna can be constantly present when multiple tags are
16 expected continually. If constant interrogation is not required, the field can be activated by a sensor
17 device.

18 FIG. 6 is a schematic block diagram of a hybrid mobile terminal having a game function in
19 accordance with a second embodiment of the present invention. The hybrid terminal can be a game
20 phone.

21 Unlike the terminal of FIG. 5, game phone 141 of FIG. 6 may be constructed with a first

1 processing section 145 (for example, a communication processor), a second processing section 143
2 (for example, a game processor) and a dual port memory for data exchange between the two
3 processing sections 143, 145.

4 The communication processor 145 includes a communication microprocessor MPU 165, an
5 RF/analog section 155, a digital signal processor DSP 159, a keypad 163, a display section 157 and
6 a memory 161.

7 Communication microprocessor 165 incorporated into communication processor 165
8 includes a monitoring section 165a that monitors a condition representative of the progress of the
9 terminal toward satisfaction of the user's demand for activation and implementation of an additional
10 function while telephone 141 is being continuously held in the communication mode, an execute
11 section 165b for performing at least one task to use the additional function selected when the
12 condition has been met, and a mode changing section 165c for changing the operational mode from
13 phone to the operational mode corresponding to the user's selection of that additional function.
14 Execute section 165b is identical to first execute section 165b in FIG. 5.

15 Communication microprocessor MPU 165 performs at least one task for using the additional
16 function solely, or alternatively together with a game microprocessor MPU 151 incorporated into
17 game processing section 143. When the precedent condition to satisfaction of the user's demand has
18 been met, the mobile terminal informs the user that a determination has been made that the condition
19 has been met, so that the user can select a mode change in step 185 in FIG. 7 to implement the
20 additional function. Although not shown in the drawings, in an alternative configuration, terminal
21 141 can also be configured for implementing an automatic change of mode, even without the user's

1 selection of a mode change, whenever the user selects a function during the course of one operational
2 mode that is to be executed during a different operational mode. When the user inputs a demand for
3 implementing an additional function in step 173, mobile terminal 141 can be set to automatically
4 change its operational mode later, when the fixed condition is met. Alternatively, the terminal can
5 be programmed to automatically change the mode by default, regardless of the user's selection; that
6 is, step 185 in FIG. 7 can be skipped.

7 Game processor 143 includes a Main Processor Unit, for example, 104MHz ARM925 MPU
8 151 from Texas Instruments, Inc., which is a main arithmetic unit for controlling a game function,
9 memory 149 for storing data according to the game algorithm, and multimedia card reader 147.

10 Part, or all, of the functional elements of communication microprocessor MPU 165, for
11 example, monitoring section 165a, execute section 165b and mode changing section 165c, may be
12 included in the game MPU 151.

13 FIG. 7 is a flow chart showing the several possible steps for completing a process of
14 preparing fast implementation of a function in a multi-purpose hybrid terminal according to the
15 present invention.

16 When turned on, terminal 141 may initially be set in the phone mode at step 171. At step
17 173, terminal 141 detects whether a demand has been input by a user for implementing a function.
18 The user can input the demand by various methods, such as with a series of key inputs through
19 manual manipulation of one, or more, of the several keys borne by keypad 163, in response to the
20 visual and textural prompts provided by the visual images projected by display section 157, with,
21 for example, screen 101 or 103, as shown in FIG. 3.

1 If an input of the user's demand is detected, mobile terminal 141 will store the demand in
2 memory 161, 161A at step 175. At step 177, mobile terminal 141, while remaining in the phone
3 mode, determines whether a condition satisfying the user's demand has been met. For example, if
4 the condition is a fixed time, the terminal will monitor the condition by checking a timer. If the
5 condition relates to a place, the terminal will obtain its positional data using a GPS receiver, an RFID
6 (Radio Frequency Identification) reader that is, either an interrogator or a tag such as a transducer,
7 not separately shown in FIG. 5 or 6, and the communication microprocessor MPU 165. Also, the
8 terminal will determine whether the positional data coincide with the condition satisfying the user's
9 demand; that is, in step 177, terminal 141 makes a determination of whether the positional data
10 received from such external sources such as a global positioning receiver (*i.e.*, a GPS receiver) or
11 a radio frequency identification indicator or tag (*i.e.*, a RFID tag) either coincide with, or fall within
12 a range, established by the condition corresponding to the user's demand. Alternatively, such
13 external sources such as a global positioning receiver or a radio frequency identification indicator
14 or tag may be incorporated into the terminal. Various conditions, such as a time, a place, or a
15 geographical or physical location, or a combination thereof, can be set as a condition precedent.

16 When step 177 determines that the condition precedent corresponding to the user's demand
17 input in step 173 has been satisfied, the terminal sends a command to load the game file to game
18 microprocessor MPU 151 at step 179. At step 181, the terminal commands preparation for the
19 implementation of a game, such as input/output control and the game mode setting. To be specific,
20 a pertinent command is sent to the game MPU 151 through a General Port for Input/Output (*i.e.*, a
21 GPIO) of communication microprocessor MPU 165.

1 Upon completion of the tasks performed by game microprocessor MPU 151, at step 183
2 terminal 141 informs the user about the completion of game mode setting. In this regard, various
3 methods, such as illumination of a light emitting diode, a bell sound or vibration, can be used.
4 Alternatively, part of display section 157 which is in the phone mode can be changed to the game
5 mode.

6 FIG. 8 shows messages sequentially displayed on display section 157 of a hybrid terminal
7 141 according to the present invention, to inform the user of the completion of preparation and the
8 operational readiness of an additional function, pursuant to step 183.

9 Referring to FIG. 8, screens 201 and 203 show display section 175 in the phone mode of
10 terminal 141. Display section 175 in the phone mode with screen 203 displays a message with the
11 text "GAME READY" appears on screen 203 to inform the user of the game mode setting (*i.e.*,
12 loading of the algorithm for execution of the selected game) in progress to load and activate the
13 game. Display section 175 lastly displays a message on screen 205 with the text "PLAY BALL!!!",
14 to inform the user of the completion of the game mode setting, thereby indicating to the user that the
15 selected game is operationally available for the enjoyment of the user.

16 Referring back to FIG. 7, the user who has been informed of the completion of the additional
17 functional mode setting can select immediate implementation of the additional function selected by
18 the user in step 173. At step 185, the terminal checks the user's selection and may determine
19 whether the user has indicated a preference for immediate implementation of the selected function.
20 If the determination establishes that the user has not selected immediate implementation of the
21 additional function, the terminal will maintain the phone mode without interruption. Otherwise,

1 terminal 141 will terminate the phone mode at step 187 and will enter the additional function mode
2 at step 189. At step 191, the terminal executes the application program corresponding to the function
3 indicated by the user's demand.

4 When the user inputs a demand for implementing an additional function and a condition
5 therefor in step 173, mobile terminal 141 can be set to automatically change its operational mode to
6 the additional function mode upon completion of the preparation for implementing the selected
7 function, without the user's selection of the mode change. If so, step 185 will be skipped to
8 accommodate for the automatic mode change. Alternatively, the terminal can be programmed to
9 skip step 185 in order to automatically change the mode by default, regardless of the user's selection
10 and preference.

11 As described above, the multi-purpose hybrid terminal constructed according to the present
12 invention can prepare in one mode, that is, during the current mode, a function to be performed
13 during another mode, and inform the user of the completion of the preparation, thereby enabling the
14 user to conveniently use a desired function, without significant delay of time, and without
15 interrupting the operational availability of the current mode.

16 If a user of a game phone wishes to regularly implement a game program at a fixed time for
17 example, at rush hour, the user should, in advance, store the condition for implementing the game
18 program. The game phone keeps monitoring its state to determine whether the condition for
19 satisfying the user's demand has been met. Also, the game phone performs a series of tasks in order
20 to expedite the user's fast access to the game.

21 If a user of a TV phone wishes to watch a news program broadcasted at a fixed time in a

1 particular region, that is, within a fixed place, in consideration of the regional characteristic of TV
2 broadcasting and inputs the fixed time and geographic or fixed location corresponding to the user's
3 designation of a region or place as one or more conditions precedent to display of the program, the
4 TV phone will perform a series of tasks requiring key manipulation, such as image quality
5 adjustment and selection of a channel on which the news program is broadcasted. The TV phone
6 will inform the user when the preparation for implementing the TV function is completed so that the
7 user can promptly watch the desired news program at the time selected by the user, without much
8 delay of time.

9 The present invention is also applicable to a hybrid terminal with an RFID tag and an
10 automobile with an RFID reader. When a user having an RFID tagged terminal takes a car, an RFID
11 reader mounted in the car reads the RFID tag of the terminal and commands the RFID tag to perform
12 one or more preset functions. The RFID then transfer the command to the terminal to perform the
13 function. For example, one preset function can be "a change to hands-free mode." The RFID reader
14 senses when the user rides the car. The RFID commands the terminal to change in mode from a
15 normal mode to a hands-free mode through the detection of the RFID tag. Accordingly, the terminal
16 changes its mode to the hands-free mode and informs the user about the change of operational mode
17 according to the present invention.

18 Although preferred embodiments of the present invention have been described for illustrative
19 purposes, those skilled in the art will appreciate that various modifications, additions and
20 substitutions are possible, without departing from the scope and spirit of the invention as disclosed
21 in the accompanying claims, including the full scope of equivalents thereof.